

WHAT IS CLAIMED IS:

1. A wavelength converting element comprising:

an optical crystal substrate;

inverted domains formed at an interior of the optical crystal substrate; and

a waveguide which is formed by ion implantation and which intersects the inverted domains.

2. A wavelength converting element according to claim 1, wherein the waveguide is formed by proton implantation.

3. A method of manufacturing a wavelength converting element comprising a step of forming a waveguide by carrying out ion implantation after inverted domains have been formed at an interior of an optical crystal substrate.

4. A method of manufacturing a wavelength converting element comprising a step of forming inverted domains after a waveguide has been formed at an interior of an optical crystal substrate by carrying out ion implantation.

5. A method of manufacturing a wavelength converting element comprising the steps of:

forming inverted domains at an interior of an optical crystal

substrate;

pattern-forming a metal film on the optical crystal substrate at which the inverted domains have been formed, such that at least a region at which a waveguide is to be formed is exposed;

applying a negative photoresist on the patterned metal film;

exposing the negative photoresist by using the patterned metal film as a mask, by irradiating ultraviolet light from a reverse surface of the optical crystal substrate to which the negative photoresist has been applied;

carrying out developing thereafter so as to form a resist pattern on the region at which the waveguide is to be formed;

forming a metal film by electroplating by using the patterned metal film as an electrode and by using the negative photoresist as a mask;

removing the negative photoresist thereafter;

carrying out ion implantation at portions of the optical crystal substrate from which the negative photoresist has been removed, by using the metal film formed by the electroplating as an ion implantation mask; and

forming an optical waveguide by carrying out annealing thereafter.

6. A method of manufacturing a wavelength converting element according to claim 5, wherein given that an angle formed by a surface of the optical crystal substrate and a C axis of the optical

crystal substrate is θ , a period at which the inverted domains are formed is p , and a distance from a distal end of a comb-shaped electrode, which is for forming the inverted domain and which is formed at the surface of the optical crystal substrate, to a central position of the waveguide formed by the ion implantation is G ,

in the ion implantation, the concentration peak of the ion implantation is formed at a distance of substantially $(G \cdot \tan \theta + p/4)$ from the surface of the optical crystal substrate.

7. A method of manufacturing a wavelength converting element according to claim 5, wherein the metal film formed by the electroplating is a gold film.

8. A method of manufacturing a wavelength converting element according to claim 6, wherein the metal film formed by the electroplating is a gold film.

9. A method of manufacturing a wavelength converting element according to claim 3, wherein in the ion implantation, protons are implanted.

10. A method of manufacturing a wavelength converting element according to claim 4, wherein in the ion implantation, protons are implanted.

11. A method of manufacturing a wavelength converting element according to claim 5, wherein in the ion implantation, protons are implanted.

12. A method of manufacturing a wavelength converting element according to claim 6, wherein in the ion implantation, protons are implanted.

13. A method of manufacturing a wavelength converting element according to claim 7, wherein in the ion implantation, protons are implanted.

14. A method of manufacturing a wavelength converting element according to claim 8, wherein in the ion implantation, protons are implanted.